



Rec'd PCT/PTO 16 JUN 2005
PCT/GB 2003 / 0 0 5 3 5 1 #2



INVESTOR IN PEOPLE

The Patent Office
Concept House
Cardiff Road
Newport

South Wales RECEIVED
NP10 8QQ 16 JAN 2004

WIPO PCT

PRIORITY DOCUMENT
SUBMITTED OR TRANSMITTED IN
COMPLIANCE WITH
RULE 17.1(a) OR (b)

I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

In accordance with the Patents (Companies Re-registration) Rules 1982, if a company named in this certificate and any accompanying documents has re-registered under the Companies Act 1980 with the same name as that with which it was registered immediately before re-registration save for the substitution as, or inclusion as, the last part of the name of the words "public limited company" or their equivalents in Welsh, references to the name of the company in this certificate and any accompanying documents shall be treated as references to the name with which it is so re-registered.

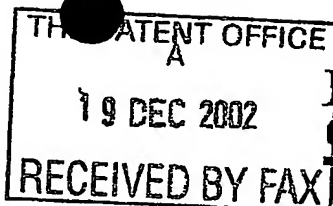
In accordance with the rules, the words "public limited company" may be replaced by p.l.c., plc, P.L.C. or PLC.

Re-registration under the Companies Act does not constitute a new legal entity but merely subjects the company to certain additional company law rules.

Signed

Dated 6 January 2004

Patents Form 1/77

Patents Act 1977
(Rule 16)The
Patent
Office19DEC02 E772244-1 D02835
P01/7700 0.00-0229565.7**Request for grant of a patent***(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)*

The Patent Office

Cardiff Road
Newport
South Wales
NP23 5RH

1. Your reference

P350913GB

2. Patent application number

(The Patent Office will fill in this part)

0229565.7

19 DEC 2002

3. Full name, address and postcode of the or of each applicant *(underline all surnames)*

① HAROLD KEITH BRAID

Braceborough House, Braceborough, Lincolnshire
PE9 4NT, UKand ① 0852 0206001
② 0649 1302002Patents ADP number *(if you know it)*

If the applicant is a corporate body, give the country/state of its incorporation

② SIMON CHRISOPHER BRAID

Hemborough, 69A High Street, Maxey,
Peterborough PE6 8EB, UK

4. Title of the invention

A MODULAR SPRING MOUNTING FOR A SASH WINDOW COUNTERBALANCE
ARRANGEMENT5. Name of your agent *(if you have one)**"Address for service" in the United Kingdom
to which all correspondence should be sent
(including the postcode)*URQUHART-DYKES & LORD
NEW PRIESTGATE HOUSE
57 PRIESTGATE
PETERBOROUGH
CAMBRIDGESHIRE PE1 1JX
UNITED KINGDOMPatents ADP number *(if you know it)*

0001644009 ✓

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and *(if you know it)* the or each application number

Country

Priority application number
*(if you know it)*Date of filing
(day / month / year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing
*(day / month / year)*8. Is a statement of inventorship and of right to grant of a patent required in support of this request? *(Answer "Yes" if)*

YES

a) any applicant named in part 3 is not an inventor; or
b) there is an inventor who is not named as an applicant; orc) any named applicant is a corporate body.
See note (d))

Patents Form 1/77

0055939 19 Dec 02 04:29

Patents Form 1/77

9. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document

Continuation sheets of this form

Description 18

Claim(s) 5

Abstract 1 DM

Drawing(s) 6

10. If you are also filing any of the following, state how many against each item.

Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (Patents Form 7/77)

Request for preliminary examination and search (Patents Form 9/77)

Request for substantive examination (Patents Form 10/77)

Any other documents (please specify)

FEE SHEET /

11. I/We request the grant of a patent on the basis of this application.

Signature *Urquhart-Dykes & Lord* Date

URQUHART-DYKES & LORD 19 Dec 2002

12. Name and daytime telephone number of person to contact in the United Kingdom DREW LAMB - 01733 340011

Warning

After an application for a patent has been filed, the Comptroller of the Patent Office will consider whether publication or communication of the invention should be prohibited or restricted under Section 22 of the Patents Act 1977. You will be informed if it is necessary to prohibit or restrict your invention in this way. Furthermore, if you live in the United Kingdom, Section 23 of the Patents Act 1977 stops you from applying for a patent abroad without first getting written permission from the Patent Office unless an application has been filed at least 6 weeks beforehand in the United Kingdom for a patent for the same invention and either no direction prohibiting publication or communication has been given, or any such direction has been revoked.

Notes

- If you need help to fill in this form or you have any questions, please contact the Patent Office on 0645 500505.
- Write your answers in capital letters using black ink or you may type them.
- If there is not enough space for all the relevant details on any part of this form, please continue on a separate sheet of paper and write "see continuation sheet" in the relevant part(s). Any continuation sheet should be attached to this form.
- If you have answered 'Yes' Patents Form 7/77 will need to be filed.
- Once you have filled in the form you must remember to sign and date it.
- For details of the fee and ways to pay please contact the Patent Office.

Patents Form 1/77

Duplicate

1

P350913GB

A MODULAR SPRING MOUNTING FOR A SASH WINDOW COUNTERBALANCE
ARRANGEMENT

The present invention relates to sash windows and in particular to a mounting for a spring counterbalance arrangement used in such sash windows.

Modern sash windows utilise coiled ribbon springs which
5 are mounted within the window jamb channels of the window frame and are arranged to unwind as the sash window is slid and moved within the window frame. The coiled springs provide a counterbalancing force, by virtue of the spring tension of the springs, to counterbalance the weight of the sash window
10 thereby making movement and opening of the window easier. Typically the coiled springs are mounted to the window frame within the vertical window jamb channels either side of the sash window using a mounting/support arrangement. A free end, referred to as a tail, of the spring is connected to a sash
15 shoe slidably located within the window jamb channel. The sash shoe in turn is connected to the sash window, usually towards the lower portion of the sash window. The coiled springs are generally of a constant tension type in which an outer profile of the coil is rotatably held and supported
20 within the spring mounting/support. The spring mounting/support is secured to the window frame within the window jamb channel. An inner end of the spring is free such that the coiled spring can rotate as the spring is unwound and the tail (outer free end) of the spring attached to the
25 sash shoe, is extended and drawn out as the window is moved.

Examples of prior arrangements of the above general type are well-known and common place within the industry. Specific examples are described in the following patents and patent applications:

30 UK Published Patent application GB 2369644;

UK patent application number 0207417.7;

US patent number US 6,412,144;

US patent number US 6,393,661; and

US patent number US 5,365,638.

- 5 The text of these patents, and patent applications, are incorporated in their entirety herein by reference.

Modular spring support mountings have been proposed in the prior art, for example in US patent 5,365,638 in which a plurality of spring support mounting elements, one for each
10 single spring, are stacked on top of one another with each mounting element provided with interengagement formations which when the elements are stacked vertically, and are vertically slid together, interengage and 'snap fit' to connect the elements together to form the multiple spring
15 mounting.

With such a modular spring support arrangement spring supports for different numbers of springs, and so different counterbalance forces, can be readily provided by simply adding additional modules to the stack. A modular arrangement
20 is also easier to install within the window jamb channel, with each of the individual modules being separately inserted into the channel and then slid vertically to interengage and stack together.

While the prior modular spring mounting arrangement, as
25 described in US 5,365,638 provides a practical method of mounting and supporting the counterbalance springs, there are a number of problems with such an arrangement, and the modular spring mounting arrangement can be improved generally. In particular, and inherently in the modular
30 arrangement of US 5,365,638, it has been identified that in use the vertical engagement and securing together of the modules is relatively insecure and the individual modules can easily become detached from each other once installed, and

in particular during opening and closing of the windows. This can lead to jamming of the window. The modular arrangement of US 5,365,638 is also relatively long and undesirably occupies a significant length of the jamb channel.

5

It is therefore desirable to provide an improved modular spring mounting arrangement for a sash window counterbalance which addresses the above described problems and/or which offers improvements generally.

10

According to the present invention there is provided a modular spring mounting for a sash window counterbalance arrangement, and a method of installing a modular spring mounting for a sash window counterbalance arrangement, as described in the accompanying claims.

15

In an aspect of an embodiment of the invention there is provided a modular spring support mounting for a sash window spring counterbalance arrangement. The modular spring support mounting comprises at least a first spring support mounting element and a second spring support mounting element each for supporting a respective coil spring. The first spring support mounting element includes a pair of wedged shaped cross section projections which extend normally from the spring support mounting element and are laterally spaced apart and inwardly oppositely directed. The second spring support mounting element includes an interengagement fitting which engages the pair of wedged shaped cross section projections to in use securely interconnect the first and second spring support mounting elements together.

20

25

This arrangement provides a more secure and compact interconnection and interlocking between the spring support modules of a modular spring support, which in use is less likely to be disrupted and disconnected by vertical impact and/or movement.

30

The interengagement fitting preferably comprises a dovetail cross section projection which is engaged between the laterally spaced wedged shaped cross section projections.

5 The interengagement fitting may comprise a narrowed neck portion corresponding to the lateral spacing between the pair of laterally spaced apart projections. The narrowed neck portion is engaged between the pair of laterally spaced apart projections to in use securely interconnect the first and second spring support mounting elements together.

10 Alternatively the interengagement fitting comprises a pair of corresponding shoulder supports upon within which the respective wedged shaped cross section projections abut and are engaged. Each of the shoulder supports may comprise a cradle corresponding to, and for, a respective wedged
15 shaped cross section projection. Each of the shoulder supports then further comprises a lip edge which hooks over an upper apex edge of the respective wedged shaped cross section projection fitted to vertically secure the wedge shaped cross section projections vertically within the
20 shoulder support.

The interengagement fitting and pair of wedged shaped cross section projections are adapted to engage and securely interconnect the first and second spring support mounting elements together by aligning the interengagement fitting and
25 pair of wedged shaped cross section projections and laterally sliding the spring support mounting elements relative to each other.

The interengagement fitting and pair of wedged shaped cross section projections together preferably further define
30 and provide a support surface for at least one of the coiled ribbon springs.

This provides a simple an compact arrangement which is easy to manufacture with the interengagement fitting and pair

5

P350913GB

of wedged shaped cross section projections advantageously having a interrelated dual functionality.

In a further aspect of an embodiment of the invention there is provided a modular spring support mounting for a sash window spring counterbalance arrangement. The modular spring support mounting comprising at least a first spring support mounting element and a second spring support mounting element. The first spring support mounting element includes a pair of laterally spaced apart projections which extend normally from the spring support mounting element. The second spring support mounting element includes interengagement fitting comprising a narrowed neck portion corresponding to the lateral spacing between the pair of laterally spaced apart projections. The narrowed neck portion is engaged between the pair laterally spaced apart projections to in use securely interconnect the first and second spring support mounting elements together.

In a yet further aspect of an embodiment of the invention there is provided a method of installing a modular spring support mounting for a sash window spring counterbalance arrangement within a window jamb channel section. The modular spring support mounting comprising at least a first spring support mounting element and a second spring support mounting element. The first and second spring support mounting elements including a corresponding wedged shaped interlocking arrangement to securely interlock the spring support mounting elements together. The method comprising:

- a) inserting the first spring support mounting element into the window jamb channel,
- b) laterally aligning the corresponding wedged shaped interlocking arrangement of the first and second spring support mounting elements, and

c) laterally sliding the second spring support mounting element relative to the first spring support mounting element to engage the wedged shaped interlocking arrangement and securely interlock the spring support mounting elements together within the window jamb channel.

This method provides a simple and convenient way to install a spring mounting support element for multiple springs (which may overall have a considerable length) within a window jamb channel via a relatively small access opening provided in the window jamb channel. The method also ensuring that the mounting elements are securely interlocked together to provide a stable and robust support for the springs.

After inserting the first spring support mounting element into the window jamb channel the first spring support mounting element may be longitudinally slid within the window jamb to align the corresponding wedged shaped interlocking arrangement of the first and second spring support mounting elements.

The present invention will now be described by way of example only with reference to the following figures in which:

Figure 1 is a schematic representation of a complete sash window assembly, with part of the window frame cut away to show the spring counterbalance arrangement;

Figure 2 is a more detailed elevational view of the modular spring mounting arrangement, in accordance with an embodiment of the present invention, for the sash window spring counterbalance arrangement of figure 1, and showing the modular spring mounting arrangement, coil springs and sash shoe of the sash window counterbalance arrangement;

Figure 3 is a perspective view of the modular spring

7

P350913GB

mounting arrangement shown in figure 2, but with the coil springs omitted for clarity;

Figure 4 is a perspective part view of the window jamb showing the window jamb shown in figure 1 in more detail with
5 the modular spring mounting for the sash window counterbalance installed within one of the window jamb channels of the window;

Figures 5a, 5b, and 5c are respectively more detailed views of the respective lower, middle and upper spring
10 mounting element modules of the modular spring mounting shown in figure 2;

Figures 6a, 6b and 6c are a series of schematic illustrative side elevational views illustrating the method of assembling and installing the modular spring mounting
15 shown in figure 2 within the window jamb channel;

Figure 7 is an elevational view, similar to that of figure 2, of a modular spring mounting in accordance with a second embodiment of the present invention;

Figures 8a, 8b, and 8c are respectively more detailed views of the respective lower, middle and upper spring
20 mounting element modules of the modular spring mounting shown in figure 7.

Referring to figure 1, a sash window 1 comprises upper
25 2 and lower 4 sashes, which are slidably mounted within a window frame 5 such that each sash 2,4, can be slid vertically, as indicated by arrow A, to open the window. The sashes 2,4, are disposed generally vertically in an overlapping arrangement with one disposed closely adjacent
30 to the other and in operation sliding behind each other.

The window frame 5 comprises upper 6 and lower 8 horizontal frame members and two vertical laterally spaced window jamb members 10,12. The window jamb members 10,12,

each define double vertically extending window jamb channel sections 9, as illustrated in figure 4. The window jamb channel sections 9, of the double channel section in each window jamb 10,12, are disposed side by side adjacent to and along the length of the window jamb 10,12, adjacent to the lateral side of a respective sash window 2,4. Each channel section 9 is defined by a rear wall 11, pair of side walls 13 projecting forward from the rear wall 11 and a pair of front walls 14a,14b, which are parallel and spaced from the rear wall 11 and partially close off the channel section 9. An open part 15 of the channel section 9 faces the respective lateral side of the sash window 2,4. The window frame 5, and window jamb channels 9 are typically fabricated from extruded uPVC sections which are joined together to form the window frame 5. Each of the channel sections 9 of the double channel sections are generally similar with each channel section 9 of the double channel section within each of the window jambs 10,12, associated with a respective sash window 2,4. At a point along the length of the channel sections 9 there is enlarged access opening 40 where at least a portion of the front walls 14a,14b are removed/missing to provide a enlarged opening into the channel 9. Such an access opening 40 is an industry standard feature of such window frames, and is typically 50mm in length. The access opening 40 allows access to the channel 9 for installation and fitting of the counterbalance components within the channel sections 9.

Pivot pins 18, located towards the lower part of the sash window 2,4, extend and project laterally from the lower sides of the sash window 2,4. Tilt latches 20, located towards the upper part of the sash window 2,4, similarly project laterally from the sides of the sash window 2,4. The distal ends of the tilt latches 20 and pivot pins 18 are engaged within the open part 15 of the respective window jamb

channels 9. The sash windows 2,4, are thereby slidably located within and with respect to the window frame 5 by the engagement of the pivot pins 18 and tilt latches 20 within the window jamb channels 9. The tilt latches 20 are also laterally retractable with respect to the sash window 2,4, such that the distal ends of the tilt latches 20 can be withdrawn from the window jamb channel sections 9. This allows the upper part of the sash windows 2,4 to be disengaged allowing the sash window 2,4 to be tilted and pivoted about the pivot pins 18.

Spring counterbalance mechanisms 16, to counterbalance the weight of the sash windows 2,4 and make vertical sliding of the sash windows 2,4, easier, are mounted and located within the channel sections 9 of the window jambs 10,12. The window jamb 10,12 and channel 9 are shown in more detail in figure 4 in which a spring support mounting can be seen located in the first channel section 9. For each sash window 2,4 a pair of spring counterbalance mechanisms 16 are provided, one on each lateral side of the sash window 2,4, with the mechanisms 16 located and mounted within the respective channel section 9 in the window jamb 10,12 for each sash window 2,4. In figure 1 only one such mechanism 16 has been schematically shown for one side of sash window 4, in the interests of clarity and brevity. The other spring counterbalance mechanism 16 on the other lateral side and mounted within the opposite window jamb channel section of the opposite window jamb 10 is generally similar. The other sash window 2 has a similar arrangement albeit mounted within the other channel section 9 of the respective window jambs 10,12 and located at a different position along the window jamb 10,12 as required for operative movement of that sash window 2.

The spring counterbalance mechanism 16 comprises a

10

P350913GB

spring arrangement comprising one or more springs 22, which are located and supported by and within a spring support mounting 24. The spring support mounting 24 is located within the channel section 9 within the window jamb 12 and window jamb channel section 9 and is fixed and secured in position to the window jamb 12. The outer free ends of the springs 22 are connected together to form a common tail 26 which extends, and in operation is drawn out from the spring support mounting 24, and is connected to a sash shoe 28. The sash shoe 28 is slidably located within the window jamb channel section 9. The pivot pin 18 of the sash window 4 is located and engaged within the sash shoe 28.

In operation, as the sash window 4 slides vertically within the window frame 5 the sash shoe 28 which is connected thereto slides vertically within the window jamb channel 9 and draws out the spring tail 26 from the spring support 24. This unwinds the spring (or springs) providing a vertical tension force. This counterbalances and offsets the weight of the sash window 4.

As described above the arrangement is generally conventional.

The modular spring support mounting 24 of a first embodiment of the invention is shown in more detail in figures 3 and 4, in which the sash shoe 28 is also shown abutting the bottom of the modular spring support mounting 24. The modular spring support mounting 24 comprises, in this embodiment, three spring support module elements (a lower spring support module element 30a, a middle spring support module element 30b, and an upper spring support module element 30c) for three respective coil ribbon springs 22. The individual spring support mounting elements 30a, 30b, 30c (or modules) are each shown in more detail in figures 5a to 5c. Each individual spring 22 is supported by a respective spring

11

P350913GB

support module 30a,30b,30c. As will be explained further, the spring support elements 30a,30b,30c are, when assembled and installed in the window jamb channel 9, interengaged together and stacked vertically on top of one another (as illustrated in figures 2 and 3) to provide the spring support mounting assembly 24 for the springs 22 within the window channel 9.

The spring support mounting elements 30a,30b,30c comprise a generally planar main body portion 32 having a front 31 and rear surface 33. When installed within the channel 9 the main body portion 32 is arranged adjacent the front wall 14a,14b of the channel 9 with the front surface 31 facing outwards from the channel 9 opening 15. The coil springs 22 in use are disposed and mounted adjacent the rear surface 33 and accordingly the springs 22 are enclosed by the main body portion 32 within the channel 9. Longitudinally along the front surface 31 of the main body there is a spine 34, which strengthens and reinforces the planar main body 32 and when installed is preferably engaged within the opening 15 between the front walls 14a,14b preventing rotation of the spring support mounting arrangement 24 within the channel 9.

The spring support module elements 30a,30b,30c are in use secured together vertically by an interlocking arrangement which securely interconnects the spring support module elements 30a,30b,30c on top of one another such that they cannot be vertically separated.

Specifically the upper 30c and middle 30b spring support module elements include respectively a pair 34 of wedged shaped projections 34a,34b which project and extend normally from the rear surface 33 of the main body 32 of the spring support module elements 30a,30b. The wedge shaped projections 34 are laterally spaced towards respective sides of the spring support module element 30c,30b at the bottom of the

12

P350913GB

elements 30b,30c. The wedge shaped projections 34 have a generally triangular cross section and are oppositely directed such that they point inwardly towards each other with a lateral spacing D between an apex edge of the respective projections 34. The lower 30a and middle 30b spring support module elements include, respectively, an interengagement fitting 37 comprising a dovetail cross section projection 36 at the top and centre of the spring support module elements 30a,30b. This dovetail projection 36 includes a narrowed neck portion 38 which has a width W1 corresponding to the lateral spacing D between the wedge shaped projections 34. The dovetail projection 36 further includes outwardly divergent angled side walls 37 which correspond to the faces of the wedge projections 34 with a distal end of the dovetail projection 36 having a width W2 greater than the lateral spacing D between the wedge shaped projections 34. The dovetail projection 36 thereby defines a pair of parallel grooves extending normally to the spring support module 30a,30b,30c. The respective pair of wedge shaped projections 34 and dovetail projections 36 are thereby arranged such that by aligning the narrowed neck portion 34 between the wedge shaped projections 34 and laterally sliding the two together (in a direction normal to the spring support elements 30a,30b,30c and along the wedge shaped projections) the dovetail projection 36 can be engaged between the wedge shaped projection 34. Specifically the narrowed neck portion 38, and grooves, are engaged between the apex edges of the wedge shaped projection 34 with the outwardly divergent angled side walls 37 of the dovetail projection 36 abutting upper surfaces of the wedge shaped projections 34. The lower angled surfaces of the wedge shaped projections 34 abut and are supported upon lower shoulders 38 of the dovetail projections 36. Figures 2 and 3 show the spring support

13

P350913GB

module elements 30a, 30b, 30c respectively engaged with the dovetail projections 36 fitted and securely engaged between the respective wedge shaped projections 34.

The wedge shaped projections 34 and dovetail projections 36 also have a combined dual functionality. In addition to interlocking the spring support modules 30a, 30b, 30c together as described above, the wedge shaped projections 34 and dovetail projections 36 also additionally provide a support means for supporting the respective coiled ribbon springs 22 associated with the upper and middle spring mounting element 30b, 30c. As shown in figure 2, the dovetail projections 36 and wedge shaped projections 34 when fitted together cooperatively define an upper arcuate support surface 42 upon which the outer circumferential surface of the coiled ribbon spring 22 rests and is supported. This can be contrasted with the lower spring 22 which is supported within the lower spring support mounting element 30a by a dedicated spring support 44.

The dual functionality and arrangement for supporting the springs 22 provides a simple and compact overall arrangement as opposed to providing separate spring supports and interlocking features. This dual functionality also simplifies manufacture and reduces manufacturing costs.

A mounting peg 46, similar to that described in US 6,393,661, projects from the lower spring support mounting element 30a. When the spring support 24 is assembled and installed in the channel 9 this mounting peg 46 engages a predrilled aperture 48 in the rear channel wall 11 to locate the spring support mounting 24 within the channel 9. The middle spring support mounting element 30b further includes a cylindrical bore 50 with a bore defined therein to receive a mounting screw or fastener (not shown) which when installed engages into the rear channel wall 11 to further secure the

14

P350913GB

spring support mounting 24 into the channel 9. Since the individual spring support mounting elements 30a, 30b, 30c when assembled and installed in the channel 9 are securely interlocked together it will be appreciated that it is not
5. required to individually secure each of the mounting elements 30a, 30b, 30c into the channel 9, but that the spring support mounting 24 can be installed as a unit. For example the upper spring support mounting element 30c is not separately fixed to the channel 9 by a separate fastener or peg, but is
10 secured by means of its interlocking engagement with the other spring support mounting elements 30b, 30a.

Whilst in this embodiment a combined fixing screw and mounting peg 46 are used to secure and locate the spring support mounting 24 in the channel, it will be appreciated
15 that other arrangements can be used. In particular the mounting arrangements described in US 6,393,661, and US 6,412,144 or pending UK patent application number 0207417.7 could be used.

The counterbalance assembly 16 and modular spring
20 support mounting 24 is installed and fitted into the window jamb channel 9 via the access opening 40. First the sash shoe 28 is inserted through the access opening 40 and slid vertically downward in the channel 9 leaving the access opening 40 clear. The lower spring mounting support element
25 30a is then similarly inserted through the access opening 40 and the lower spring mounting support element 30a and shoe 28 are slid vertically downward in the channel 9, such that the dovetail projection 36 of the lower spring mounting support element 30a is visible towards the lower end of the
30 access opening 40. The bottom of the middle spring mounting support element 30b, and the wedge shaped projections 34 of the middle spring mounting support element 30b are then vertically and laterally aligned with the top of the lower

15

P350913GB

spring mounting support element 30a, and the dovetail projection 36 thereof, through the access opening 40 and with the channel 9. The middle spring mounting support element 30b is then laterally (in a direction normal to the spring support elements 30a, 30b, 30c and along the wedge shaped projections) slid into the channel section 9, through the access opening 40, and so as to slidably engage the dovetail projection 36 between the wedge shaped projections 34. The middle spring mounting support element 30b is thereby installed within the channel 9 and interlocked on top of, and to, the lower spring mounting support element 30a. The upper spring mounting support element 30c can then be installed and interlocked in a similar manner, as illustrated in figures 6a and 6b, with it being aligned with the top of the middle spring mounting support element 30b and dovetail projection, and laterally slid (as shown by arrow X) into the channel 9 and interlocking engagement with the middle spring mounting support element 30b and spring support mounting 24. The entire assembled and interlocking spring support mounting 24 is then slid along the channel 9 until the mounting peg 46 engages the mounting aperture 48 in the rear channel wall 11 as shown in figure 6b. The fastener (not shown) is then fitted through the base 50 to secure the spring support mounting 24 in place in the channel 9.

During the above installation process the springs 22 (which are omitted from figures 6a to 6c for clarity) may be installed with their tails 26 suitably connected to each other and the shoe 28 individually as, and with, each spring mounting support element 30a, 30b, 30c. Alternatively the springs 22 can all be installed within the channel 9 together and connected to the shoe 28 with respective springs 22 then being aligned in the access opening 40 as the spring mounting support elements 30a, 30b, 30c are laterally inserted into the

16

P350913GB

channel 9 through the access opening 40.

Once the counterbalance assembly 16 and modular spring support mounting 24 is installed and fitted into the window jamb channel 9 the pivot pins 18 of the sash window 2,4, are engaged and connected to the sash shoe 28.

A second embodiment of the modular spring support is shown in figures 7 and 8a to 8c. This second embodiment is generally similar to the above described first embodiment and like features are identified by like reference numerals but prefixed by a '1'. In the interests of brevity only the significant differences between this embodiment and the first embodiment will be described.

As shown in figures 7 and 8a to 8c the spring mounting elements 130a,130b,130c are generally similar to those of the previous described embodiment. However in this embodiment the interengagement fitting and interlocking arrangement between the spring support mounting elements 30/130 differs. Specifically the dovetail projections 36 of the lower 30a and middle 30b spring support mounting elements are replaced by a pair of shoulder supports 160 upon and within which the wedge shaped projections 134 are engaged. The shoulder supports 160 project and extend from the main body 132 of the spring support mounting elements 130a,130b. The shoulder supports 160 are laterally spaced across the top of the middle and lower spring support mounting elements 130a, 130b, correspondingly to the wedge shaped projections 134. Each of the shoulder supports 160 comprises an angled lower support surface 162, and a vertical outer side upstand 164. The lower support surface 162 corresponds to a lower face of the wedge shape projection 134 which cooperatively abuts against the lower support surface 162, whilst the outer side upstand 164 is arranged to abut an outer face of the wedge shaped projection 134. The shoulder supports 160 thereby define and

17

P350913GB

provide a V shaped cradle support for the wedge shaped
protections 134. Along the upper distal edge of the outer
side upstands 164 there is an inwardly directed lip
projection 166 which is located so as to hook over an upper
5 apex edge 166 of the wedge shaped projections 134 to
vertically secure the wedge shaped projection 134 within the
shoulder support 160.

When the spring support elements 130a,130b,103c are
fitted together the wedge shaped projections 134 are engaged
10 and held with the shoulder supports 160, between the outer
side upstands 164 and upon the lower support surfaces 162 of
the respective shoulder supports 160, with the lip flanges
166 overhanging and hooked over the upper apex of the wedge
shaped projections 134. The spring support modules
15 130a,130b,103c are assembled and fitted into the channel 9
in a similar manner as described above in relation to the
previous embodiment. Specifically the spring support mounting
elements are 130a,130b,103c are aligned and then laterally
slidably engaged with each other with, in this embodiment,
20 the wedge shaped projections 134 slidably engaged inside,
between, and on the shoulder supports 160 with the upper apex
edge of the wedge shaped projections 134 slid underneath the
lip projections 166.

Overall this alternative embodiment the wedge shaped
25 projections 134 are engaged outwardly (by the shoulder
supports 160), whereas in the first embodiment the wedge
shaped projections 34 are engaged inwardly (by the
interengagement fitting (dovetail projections 36)).

A particular further advantage of this second
30 embodiment, outwardly engaging the wedges shaped is that when
assembled an opening 170 between the wedge shaped projections
134 such that the outer circumferential surfaces of the
springs 22 mounted upon the projections 134 within the

18

P350913GB

support elements 130a, 130b, 130c can in use contact each other through this gap 168 when they rapidly recoil. Such an arrangement, and specifically arranging for contact between the springs 22 under rapid recoil is described in our pending
5 published UK application GB 2369644, and provides a means to slow the recoil of the springs 22 under rapid movement in order to prevent damage.

The embodiments illustrated and described above provide a spring mounting arrangement 24 for three springs 22. It
10 will be appreciated that by adding additional spring support mounting elements 30, and in particular further middle spring support mounting elements 30b, that a spring support mounting 24 for further springs 22 can be provided. Similarly a twin spring mounting arrangement can be provided by simply
15 utilising the upper 30a and lower 30b spring support mountings. Furthermore in yet further modifications each spring support mounting elements 30 could be adapted to support more than one spring 22.

Many other minor variations and modifications of the
20 above described invention will also be apparent to those skilled in the art without departing from the invention.

19

P350913GB

CLAIMS

1. A modular spring support mounting for a sash window
spring counterbalance arrangement including a plurality
of coiled ribbon springs, the modular spring mounting
arrangement adapted to be fitted within a window jamb
channel section and to support and secure a spring
assembly within the window jamb channel; the modular
spring support mounting comprising at least a first
spring support mounting element and a second spring
support mounting element each for supporting a
respective coil spring; wherein the first spring support
mounting element includes a pair of wedged shaped cross
section projections which extend normally from the
spring support mounting element and are laterally spaced
apart and inwardly oppositely directed, and the second
spring support mounting element includes an
interengagement fitting which engages the pair of wedged
shaped cross section projections to in use securely
interconnect the first and second spring support
mounting elements together.
2. A modular spring support mounting arrangement as claimed
in claim 1 in which the interengagement fitting
comprises a dovetail cross section projection which is
engaged between the laterally spaced wedged shaped cross
section projections.
3. A modular spring support mounting arrangement as claimed
in claim 1 in which the interengagement fitting
comprises a narrowed neck portion corresponding to the
lateral spacing between the pair of laterally spaced
apart projections, the narrowed neck portion is engaged

20

P350913GB

between the pair of laterally spaced apart projections to in use securely interconnect the first and second spring support mounting elements together.

- 5 4. A modular spring support mounting arrangement as claimed in claim 1 in which the interengagement fitting comprises a pair of corresponding shoulder supports upon within which the respective wedged shaped cross section projections abut and are engaged.

10

5. A modular spring support mounting arrangement as claimed in claim 4 in which each of the shoulder supports comprises a cradle corresponding to, and for, a respective wedged shaped cross section projection, and
15 in which each of the shoulder supports further comprises a lip edge which hooks over an upper apex edge of the respective wedged shaped cross section projection fitted to vertically secure the wedge shaped cross section projections vertically within the shoulder support.

20

6. A modular spring support mounting arrangement as claimed in any preceding claim in which the interengagement fitting and pair of wedged shaped cross section projections are adapted to engage and securely
25 interconnect the first and second spring support mounting elements together by aligning the interengagement fitting and pair of wedged shaped cross section projections and laterally sliding the spring support mounting elements relative to each other.

30

7. A modular spring support mounting arrangement as claimed in any preceding claim in which the interengagement fitting and pair of wedged shaped cross section

21

P350913GB

projections together define and provide a support surface for at least one of the coiled ribbon springs.

- 5 8. A modular spring support mounting for a sash window spring counterbalance arrangement including a plurality of coiled ribbon springs, the modular spring mounting arrangement adapted to be fitted within a window jamb channel section and to support and secure a spring assembly within the window jamb channel, the modular spring support mounting comprising at least a first spring support mounting element and a second spring support mounting element each for supporting a respective coil spring; wherein the first spring support mounting element includes a pair of laterally spaced apart projections which extend normally from the spring support mounting element, and the second spring support mounting element includes interengagement fitting comprising a narrowed neck portion corresponding to the lateral spacing between the pair of laterally spaced apart projections, the narrowed neck portion engaged between the pair laterally spaced apart projections to in use securely interconnect the first and second spring support mounting elements together.
- 10 15 20
- 25 9. A method of installing a modular spring support mounting for a sash window spring counterbalance arrangement within a window jamb channel section; the modular spring support mounting comprising at least a first spring support mounting element and a second spring support mounting element, the first and second spring support mounting elements including a corresponding wedged shaped interlocking arrangement to securely interlock the spring support mounting elements together; the
- 30

method comprising:

- a) inserting the first spring support mounting element into the window jamb channel,
 - b) laterally aligning the corresponding wedged shaped interlocking arrangement of the first and second spring support mounting elements, and
 - c) laterally sliding the second spring support mounting element relative to the first spring support mounting element to engage the wedged shaped interlocking arrangement and securely interlock the spring support mounting elements together within the window jamb channel.
10. A method of installing a modular spring support mounting arrangement as claimed in claim 9 in which after inserting the first spring support mounting element into the window jamb channel the first spring support mounting element is longitudinally slid within the window jamb to align the corresponding wedged shaped interlocking arrangement of the first and second spring support mounting elements.
11. A method of installing a modular spring support mounting arrangement as claimed in claim 9 or 10 further comprising longitudinally sliding the first and second spring support mounting element within the window jamb to a required mounting position along the length of the window jamb channel.
12. A method of installing a modular spring support mounting arrangement as claimed in any one of claims 9 to 11 in which the window jamb channel includes an access opening at a position along the length of the channel through

23

P350913GB

which the first and second spring support mounting elements can be laterally inserted into the window jamb channel.

- 5 13. A method of installing a modular spring support mounting arrangement as claimed in any one of claims 9 to 12 in which the modular spring support mounting arrangement comprises a modular spring support mounting arrangement as claimed in any one of claims 1 to 8.

10

14. A modular spring support mounting arrangement for a sash window spring counterbalance substantially as hereinbefore described with reference to figures 1 to 8c.

15

15. A method of installing a modular spring support mounting arrangement within a window jamb channel section substantially as hereinbefore described with reference to figures 1 to 8c.

20

24

P350913GB

ABSTRACT

A modular spring support mounting (24) for a sash window spring counterbalance arrangement (16). The modular spring support mounting (24) comprises, at least a first spring support mounting element (30a) and a second spring support mounting element (30b) each for supporting a respective coil spring (22). The first spring support mounting element (30a) includes a pair of wedged shaped cross section projections (34). The second spring support mounting element (30b) includes an interengagement fitting (36) which engages the pair of wedged shaped cross section projections (34) to in use securely interconnect the first and second spring support mounting elements (30a,30b) together. Also a method of installing such a modular spring mounting (24) in which the spring mounting elements (30a,30b) are laterally slidingly engaged to securely interlock the elements (30a,30b) together.

20 FIG. 3

-1/6

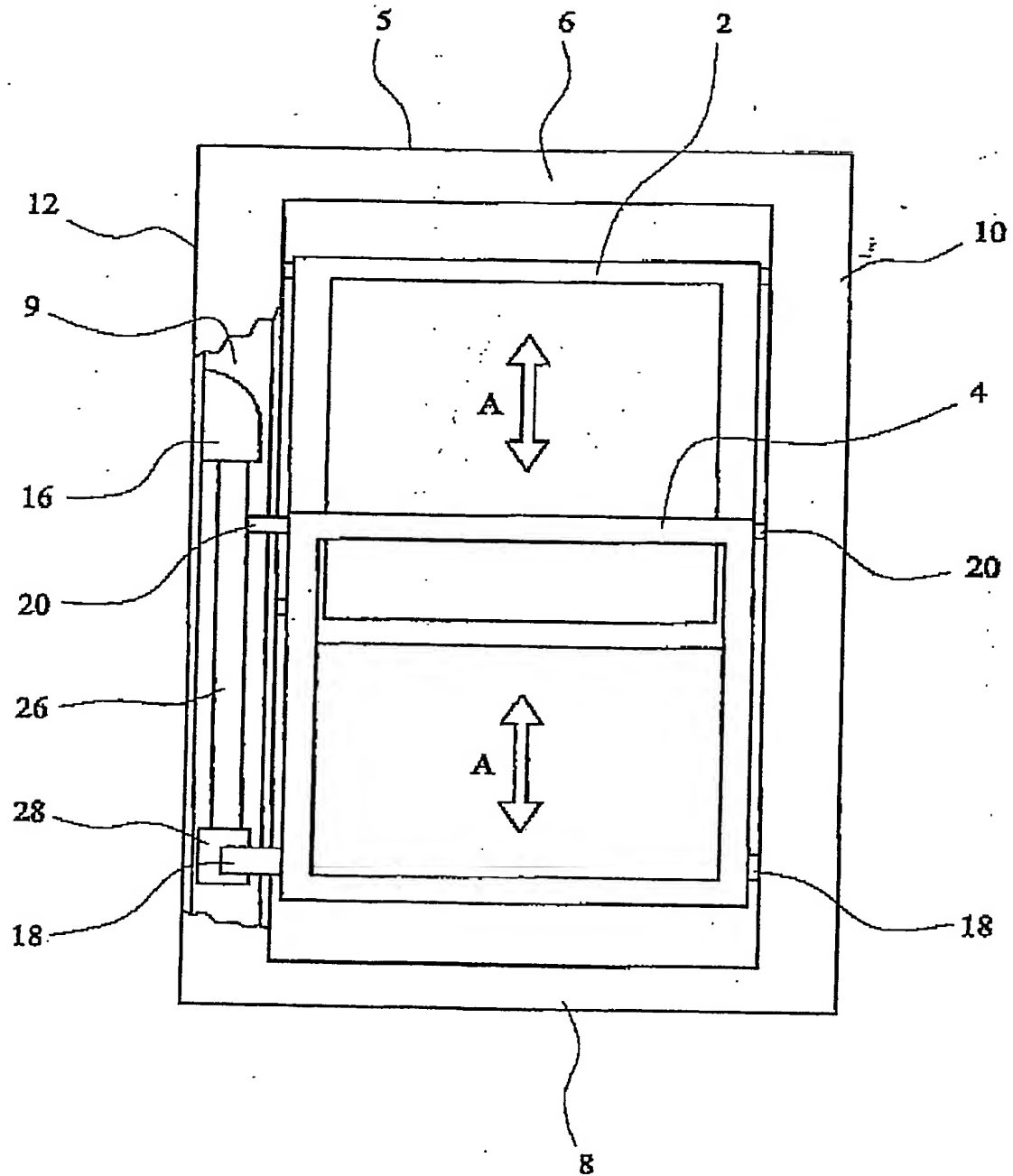


FIG. 1

2/6

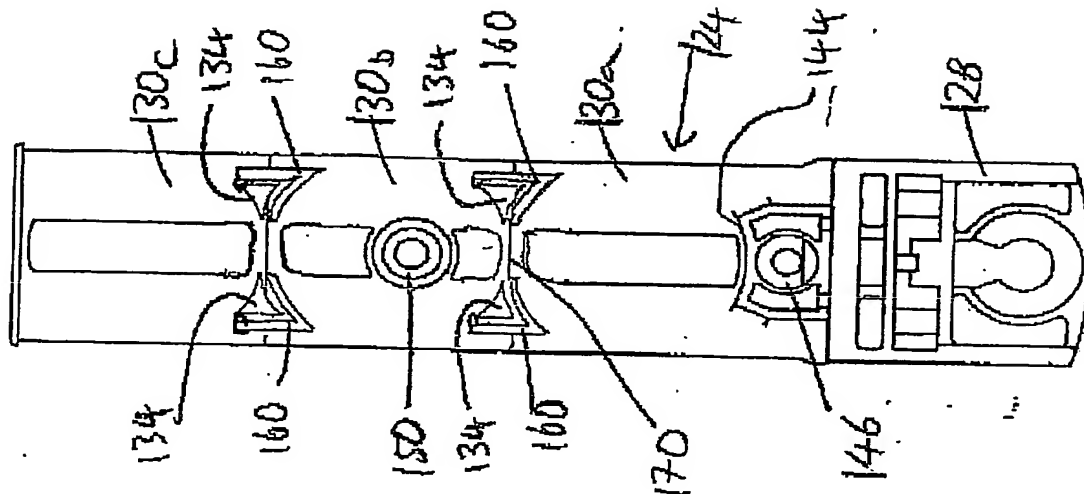


FIG 7

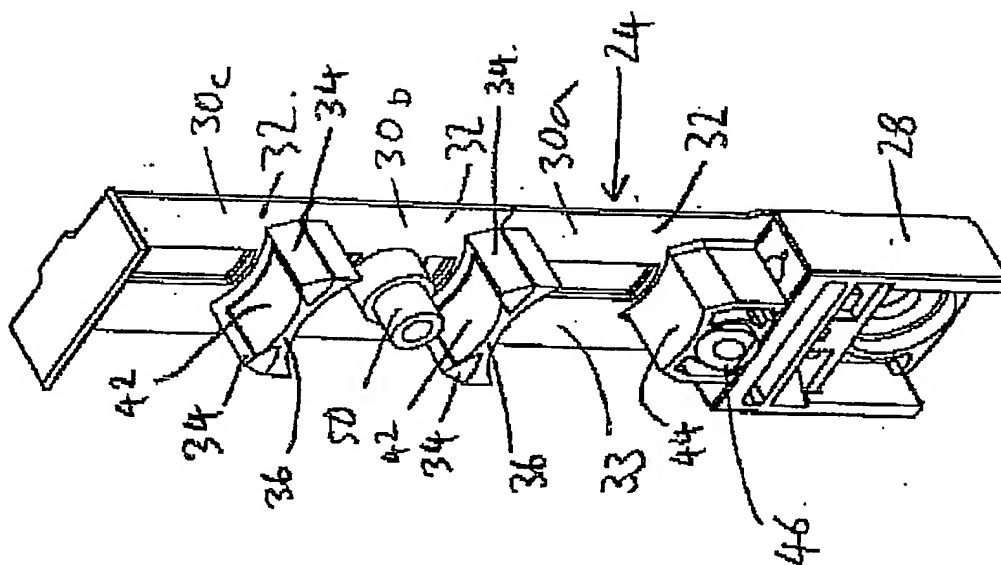


FIG 3

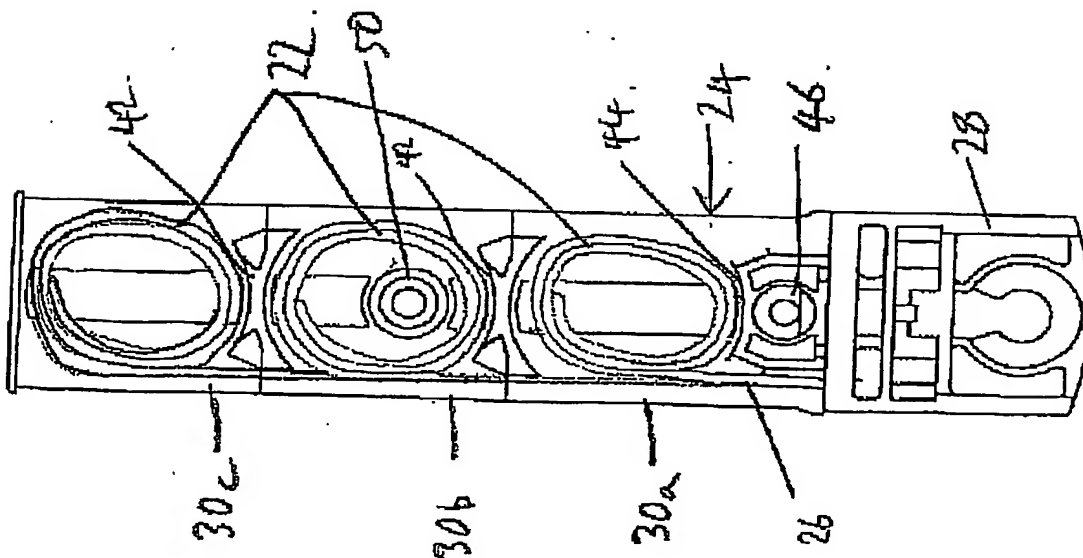
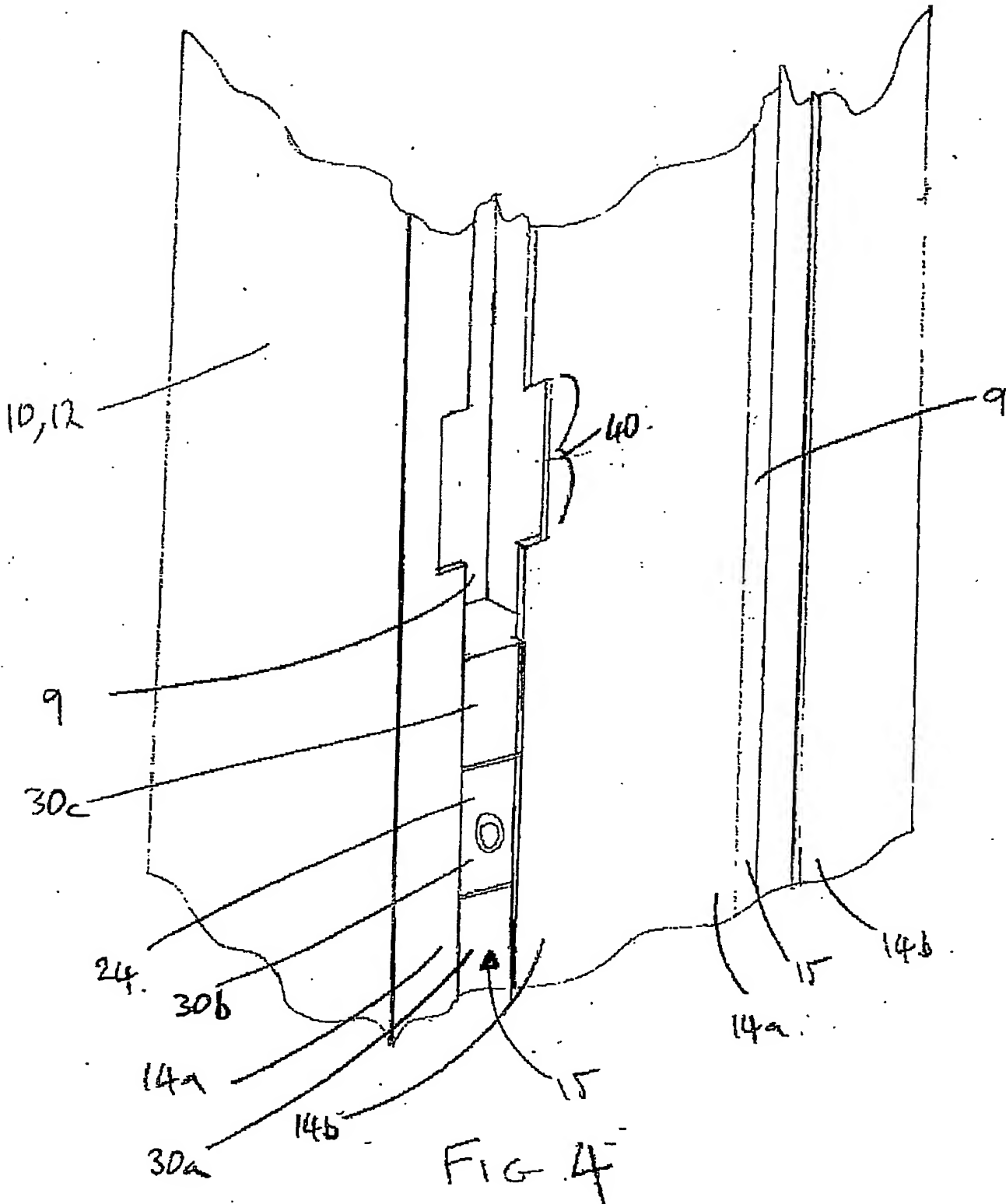


FIG 2

3/6



4/6

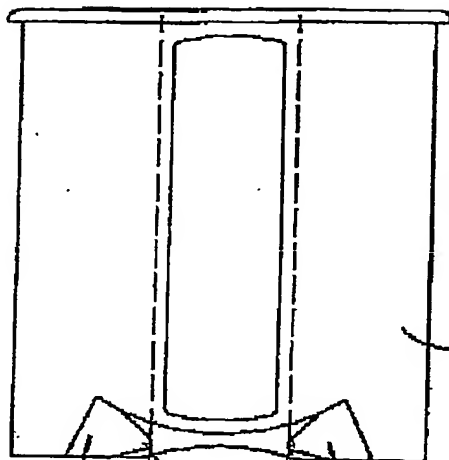


FIG 5c.

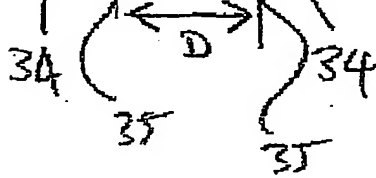


FIG 5B

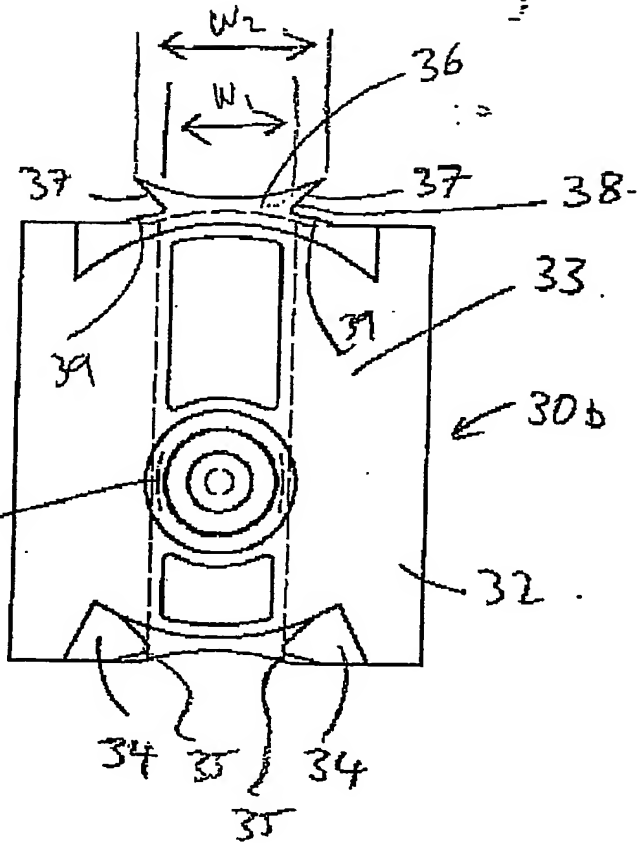
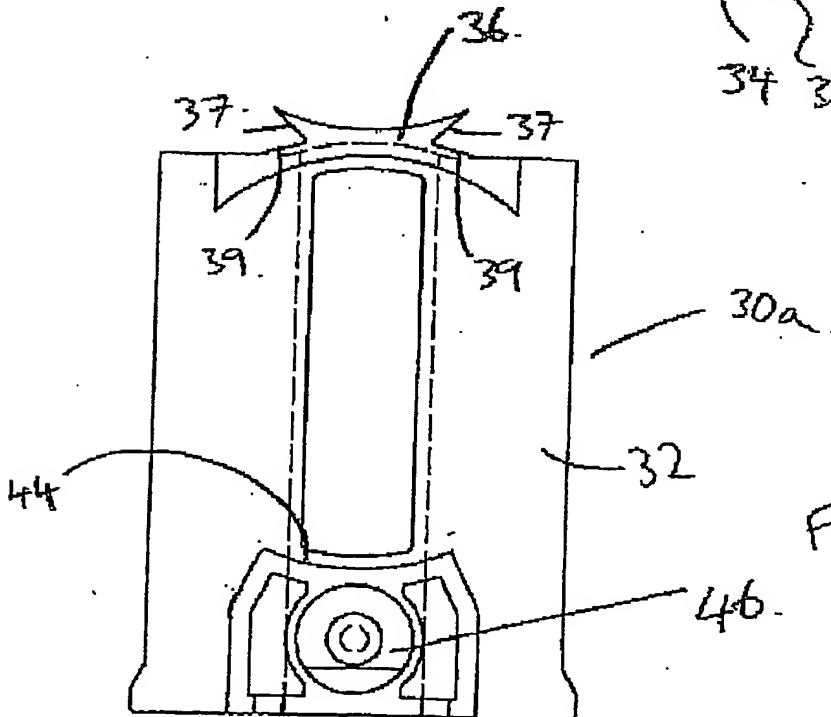
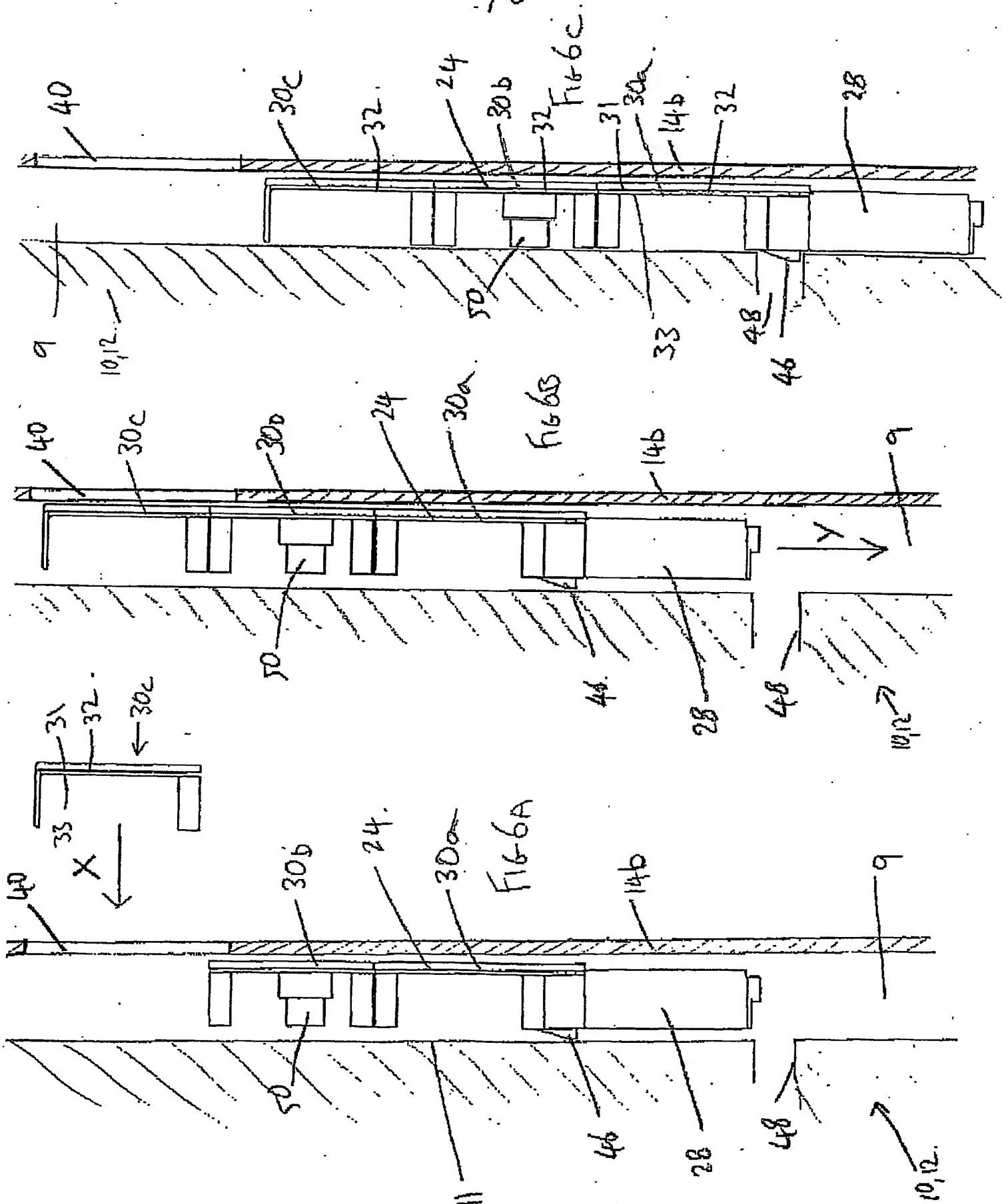


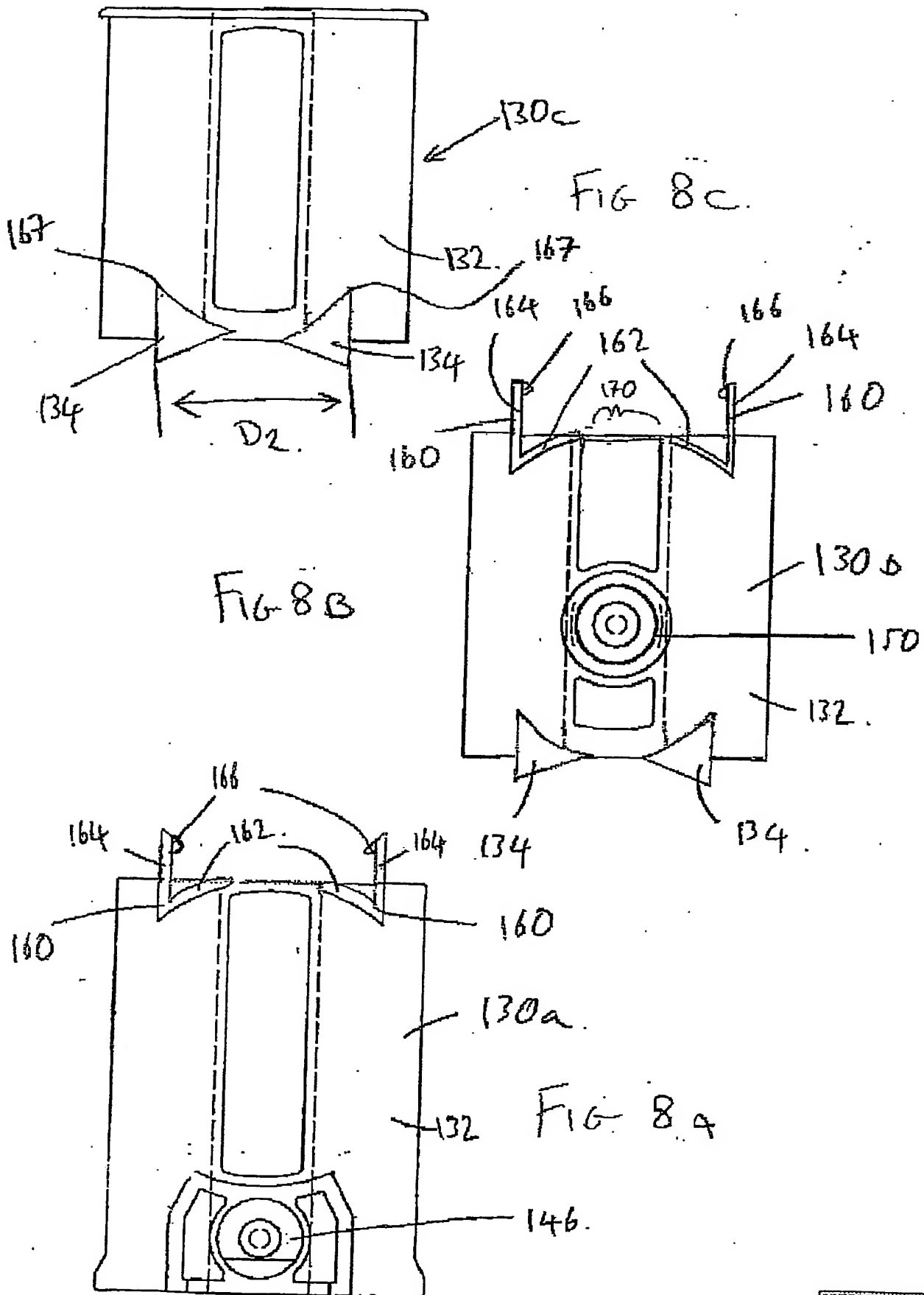
FIG 5A



5/6

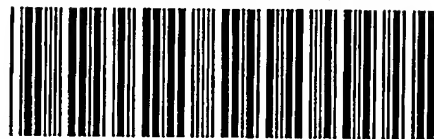


6/6



PCT Application

GB0305351



From the INTERNATIONAL BUREAU

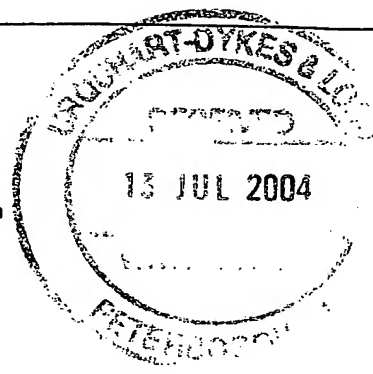
PCT

NOTICE INFORMING THE APPLICANT OF THE
COMMUNICATION OF THE INTERNATIONAL
APPLICATION TO THE DESIGNATED OFFICES

(PCT Rule 47.1(c), first sentence)

To:

LAMB, Richard, Andrew
Urquhart-Dykes & Lord LLP
New Priestgate House
57 Priestgate, Peterborough
Cambridgeshire PE1 1JX
ROYAUME-UNI



| | | |
|---|---|---|
| Date of mailing (day/month/year) 08 July 2004 (08.07.2004) | | |
| Applicant's or agent's file reference P350913WO/RAL | | |
| IMPORTANT NOTICE | | |
| International application No. PCT/GB2003/005351 | International filing date (day/month/year) 09 December 2003 (09.12.2003) | Priority date (day/month/year) 19 December 2002 (19.12.2002) |
| Applicant BRAID, Harold, Keith et al | | |

1. Notice is hereby given that the International Bureau has **communicated**, as provided in Article 20, the international application to the following designated Offices on the date indicated above as the date of mailing of this notice:

AU, AZ, BY, CH, CN, CO, DZ, EP, HU, JP, KG, KP, KR, MD, MK, MZ, RU, TM, US

In accordance with Rule 47.1(c), third sentence, those Offices will accept the present notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

2. The following designated Offices have waived the requirement for such a communication at this time:

AE, AG, AL, AM, AP, AT, BA, BB, BG, BR, BZ, CA, CR, CU, CZ, DE, DK, DM, EA, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, ID, IL, IN, IS, KE, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MG, MN, MW, MX, NI, NO, NZ, OA, OM, PG, PH, PL, PT, RO, SC, SD, SE, SG, SK, SL, SY, TJ, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW

The communication will be made to those Offices only upon their request. Furthermore, those Offices do not require the applicant to furnish a copy of the international application (Rule 49.1(a-bis)).

3. Enclosed with this notice is a copy of the international application as published by the International Bureau on 08 July 2004 (08.07.2004) under No. WO 2004/057140

4. **TIME LIMITS** for filing a demand for international preliminary examination and for entry into the national phase

The applicable time limit for entering the national phase will, **subject to what is said in the following paragraph**, be **30 MONTHS** from the priority date, not only in respect of any elected Office if a demand for international preliminary examination is filed before the expiration of **19 months** from the priority date, but also in respect of any designated Office, in the absence of filing of such demand, where Article 22(1) as modified with effect from 1 April 2002 applies in respect of that designated Office. For further details, see *PCT Gazette* No. 44/2001 of 1 November 2001, pages 19926, 19932 and 19934, as well as the *PCT Newsletter*, October and November 2001 and February 2002 issues.

In practice, time limits other than the 30-month time limit will continue to apply, for various periods of time, in respect of certain designated or elected Offices. For **regular updates on the applicable time limits** (20, 21, 30 or 31 months, or other time limit), Office by Office, refer to the *PCT Gazette*, the *PCT Newsletter* and the *PCT Applicant's Guide*, Volume II, National Chapters, all available from WIPO's Internet site, at <http://www.wipo.int/pct/en/index.html>.

For filing a **demand for international preliminary examination**, see the *PCT Applicant's Guide*, Volume I/A, Chapter IX. Only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination (at present, all PCT Contracting States are bound by Chapter II).

It is the applicant's **sole responsibility** to monitor all these time limits.

| | |
|---|--|
| The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland | Authorized officer Nora Lindner |
| Facsimile No. +41 22 740 14 35 | Facsimile No. +41 22 338 89 65 |

INTERNATIONAL SEARCH REPORT

Internat Application No

PCT/GB 03/05351

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 E05D13/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 E05D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|-----------------------|
| X | GB 2 278 626 A (BRAID HAROLD K ;BRAID SIMON CHRISTOPHER (GB)) 7 December 1994 (1994-12-07) | 1-6,8-13 |
| A | page 11, line 15 -page 13, line 21 page 12, line 19 - line 22 page 13, line 6; figures 4-8 | 7 |
| X | US 5 353 548 A (WESTFALL NORMAN R) 11 October 1994 (1994-10-11) column 6, line 13 - line 23 column 8, line 54 - line 62; figure 24 | 1-4,6,8, 9,13 |

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

A document defining the general state of the art which is not considered to be of particular relevance

E earlier document but published on or after the International filing date

L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

O document referring to an oral disclosure, use, exhibition or other means

P document published prior to the International filing date but later than the priority date claimed

T later document published after the International filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

Z document member of the same patent family

Date of the actual completion of the International search

22 March 2004

Date of mailing of the International search report

31/03/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax (+31-70) 340-3016

Authorized officer

Guillaume, G

INTERNATIONAL SEARCH REPORT

Internal Application No
PCT/GB 03/05351

| Patent document cited in search report | | Publication date | | Patent family member(s) | | Publication date |
|---|---|---------------------|----|----------------------------|--|---------------------|
| GB 2278626 | A | 07-12-1994 | CA | 2125134 A1 | | 06-12-1994 |
| US 5353548 | A | 11-10-1994 | CA | 2119506 A1 | | 02-10-1994 |
| | | | GB | 2276655 A ,B | | 05-10-1994 |
| | | | US | 5463793 A | | 07-11-1995 |

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☐ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☐ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.